REMARKS

Reconsideration of this application, as amended, is respectfully requested.

Claims 1-112 are pending. Claims 1-15, 17-39, 41-63, 65-87, and 89-112 have been rejected. Claims 16, 40, 64 and 88 have been objected to.

Claims 1, 3, 4, 8, 17, 20, 25, 27, 28, 32, 41, 44, 49, 51, 52, 56, 65, 68, 73, 75, 76, 80, 89, 92, 97, 99, 101, 103, 105, 107, 109, and 111 have been amended. Claims 2, 26, 50, 74, 98, 100, 102, 104 106, 108, 110, and 112 have been canceled. No claims have been added. Support for the amendments is found in the specification, the drawings, and in the claims as originally filed. Applicants submit that the amendments do not add new matter.

Applicants reserve all rights with respect to the applicability of the Doctrine of Equivalents.

The Examiner has objected to the specification.

Applicant has amended the specification on page 8 to include the U.S. Patent Application serial number.

The Examiner has objected to claims 8, 13-18, 20, 24, 32, 37-42, 44, 48, 56, 61-66, 68, 72, 80, 85-90, 92, and 96 because of informalities.

Applicant has amended certain claims to overcome the Examiner's objections.

Claims 97-98, 101-102, 105-106 and 109-110 are rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,665,641 to Coorman et al. (hereinafter "Coorman.").

Amended claim 97 reads as follows:

> A machine-implemented method comprising:
>
> gathering time-domain samples from recorded speech segments, wherein the time-domain samples include time samples of pitch periods surrounding a boundary of a phoneme;
>
> extracting features that represent the time-domain samples, wherein the extracting features comprises constructing a matrix from the time-domain samples and decomposing the matrix;
>
> determining a discontinuity between the segments, the discontinuity
>
> based on a distance between the features.

(Amended claim 97) (emphasis added)

Coorman discloses speech synthesis using concatenation of speech waveforms. More specifically, Coorman discloses:

> ... there is provided a speech synthesizer using a context-dependent cost function, and the embodiment includes: a. a large speech database; b. a target generator for generating a sequence of target feature vectors responsive to a phonetic transcription input; c. a waveform selector that selects a sequence of waveforms referenced by the database, each waveform in the sequence corresponding to a first non-null set of target feature vectors...

(Coorman, col. 5, lines 24-34) (emphasis added)

In particular, Coorman discloses:

> One of the features used in the transition cost is the spectral mismatch between consecutive segments. The calculation of this spectral mismatch is based on a distance calculation between spectral vectors. This might be a heavy task as there can be many segment combinations possible. In order to reduce the computational complexity a combination matrix--containing the spectral distances- could be calculated in advance for all possible spectral vectors occurring at diphone boundaries. As the speech segment database grows this approach would require ever increasing memory.

(col. 18, lines 17- 27) (emphasis added)

Thus, Coorman merely discloses the matrix that contains spectral distances. In contrast, amended claim 97 refers to gathering time-domain samples from recorded speech segments, wherein the time-domain samples include time samples of pitch periods surrounding a boundary of a phoneme; extracting features that represent the time-domain samples, wherein the extracting features comprises constructing a matrix from the time-domain samples and decomposing the matrix.

Because Coorman fails to disclose all limitations of amended claim 98, applicant respectfully submit that claim 97, as amended, is not anticipated under 35 U.S.C. § 102(e) by Coorman.

Given that claims 99, 101, 105, and 109 contain the limitations that are similar to those discussed with respect to amended claim 97, applicant respectfully submits that claims 99, 101, 105, and 109 are not anticipated under 35 U.S.C. § 102(e) by Coorman.

The Examiner rejected claims 1-8, 19-20, 25-32, 43-44, 49-56, 67-68, 73-80, 91-92, 99-100, 103-104, 107-108, and 111-112 under 35 U.S.C. § 103(a) as being unpatentable over Coorman in view of Michael Banbrook, "Nonlinear Analysis of Speech from a Synthesis Perspective", (Specifically Chapter 4) (hereinafter "Banbrook").

Amended claim 1 reads as follows:

A machine-implemented method comprising:
extracting portions from time-domain speech segments, wherein the portions include one or more pitch periods surrounding a boundary of a phoneme;

creating feature vectors that represent the portions in a vector space, the feature vectors incorporating phase information of the portions, wherein the creating feature vectors comprises constructing a matrix *W* from the portions; and decomposing the matrix *W*; and

determining a distance between the feature vectors in the vector space.

(Amended claim 1)(emphasis added)

It is respectfully submitted that Coorman does not teach or suggest a combination with Banbrook, and Banbrook does not teach or suggest a combination with Coorman. It would be impermissible hindsight, based on applicants own disclosure, to combine Coorman and Banbrook.

Coorman, as set forth above, teaches speech synthesis using concatenation of speech waveforms, and more specifically, Coorman discloses the matrix that contains spectral distances.

Banbrook, in contrast, teaches nonlinear analysis of speech. More specifically, Banbrook teaches embedding the time series into a m dimensional space (4.1., p. 36 and 37). In particular, Banbrook teaches constructing the trajectory matrix of values x and performing a singular value decomposition of the trajectory matrix of values x.

Furthermore, even if nonlinear analysis of Banbrook were incorporated into concatenation of speech waveforms of Coorman, such a combination would still lack extracting portions from time-domain speech segments, wherein the portions include one or more pitch periods surrounding a boundary of a phoneme; creating feature vectors that represent the portions in a vector space, the feature vectors incorporating phase information of the portions, wherein the creating feature vectors comprises constructing a

matrix *W* from the portions [that include one or more pitch periods surrounding a boundary of a phoneme]; and decomposing the matrix *W*; and

determining a distance between these feature vectors in the vector space, as recited in amended claim 1.

Therefore, applicant respectfully submits that amended claim 1 is not obvious under 35 U.S.C. § 103(a) over Coorman in view of Banbrook.

Given that claims 3-8, 19-20, 25, 27-32, 43-44, 49, 51-56, 67-68, 73, 75-80, 91-92, 99, 103, 107, and 111 contain limitations that are substantially similar to those discussed with respect to amended claim 1, applicant respectfully submits that claims 3-8, 19-20, 25, 27-32, 43-44, 49, 51-56, 67-68, 73, 75-80, 91-92, 99, 103, 107, and 111 are not obvious under 35 U.S.C. § 103(a) over Coorman in view of Banbrook.

The Examiner rejected claims 9-10, 21-23, 33-34, 45-47, 57-58, 69-71, 81-82, and 93-95 under 35 U.S.C. § 103(a) as being unpatentable over Coorman in view of Banbrook and further view of Ansari, et al., "Pitch Modification of Speech Using a Low-Sensitivity Inverse Filter Approach" (hereinafter "Ansari").

It is respectfully submitted that none of the references cited by the Examiner teach or suggest a combination with each other. It would be impermissible hindsight, based on applicants own disclosure, to combine Coorman, Banbrook, and Ansari.

Coorman, as set forth above, teaches speech synthesis using concatenation of speech waveforms, and more specifically, Coorman discloses the matrix that contains spectral distances.

Banbrook, in contrast, teaches nonlinear analysis of speech. More specifically, Banbrook teaches embedding the time series into a m dimensional space (4.1., p. 36 and 37). In particular, Banbrook teaches constructing the trajectory matrix of values x and

performing a singular value decomposition of the trajectory matrix of values x. Ansari, in contrast, discloses pitch modification.

Furthermore, even if the pitch modification of Ansari and nonlinear analysis of Banbrook were incorporated into concatenation of speech waveforms of Coorman, such a combination would still lack extracting portions from time-domain speech segments, wherein the portions include one or more pitch periods surrounding a boundary of a phoneme; creating feature vectors that represent the portions in a vector space, the feature vectors incorporating phase information of the portions, wherein the creating feature vectors comprises constructing a matrix *W* from the portions [that include one or more pitch periods surrounding a boundary of a phoneme]; and decomposing the matrix *W*; and determining a distance between these feature vectors in the vector space, as recited in amended claim 1.

Given that claims 9-10, 21-23, 33-34, 45-47, 57-58, 69-71, 81-82, and 93-95 contain limitations that are substantially similar to those discussed with respect to amended claim 1, applicant respectfully submit that claims 9-10, 21-23, 33-34, 45-47, 57-58, 69-71, 81-82, and 93-95 are not obvious under 35 U.S.C. § 103(a) over Coorman in view of Banbrook, and further in view of Ansari.

The Examiner rejected claims 11-15, 35-39, 59-63, and 83-86 under 35 U.S.C. § 103(a) as being unpatentable over Coorman in view of Banbrook, in view of Ansari, and further in view of Jerome R. Bellegarda, "Exploiting Latent Information in Statistical Language Modeling ("Bellegarda").

It is respectfully submitted that none of the references cited by the Examiner teach or suggest a combination with each other. It would be impermissible hindsight, based on applicants own disclosure, to combine these references.

Coorman, as set forth above, teaches speech synthesis using concatenation of speech waveforms. Banbrook, in contrast, teaches nonlinear analysis of speech. Ansari, in contrast, discloses pitch modification. Bellegarda, in contrast, teaches the use of latent semantic information.

Furthermore, even if these references were combined, such a combination would still lack extracting portions from time-domain speech segments, wherein the portions include one or more pitch periods surrounding a boundary of a phoneme; creating feature vectors that represent the portions in a vector space, the feature vectors incorporating phase information of the portions, wherein the creating feature vectors comprises constructing a matrix *W* from the portions [that include one or more pitch periods surrounding a boundary of a phoneme]; and decomposing the matrix *W*; and determining a distance between these feature vectors in the vector space, as recited in amended claim 1.

Given that claims 11-15, 35-39, 59-63, and 83-86 contain limitations that are substantially similar to those discussed with respect to amended claim 1, applicant respectfully submit that claims 11-15, 35-39, 59-63, and 83-86 are not obvious under 35 U.S.C. § 103(a) over Coorman in view of Banbrook, and further in view of Ansari.

Applicant acknowledges with appreciation the Examiner's indication of allowance of claims 16, 40, 64, and 88 if re-written in independent form including all limitations of the base claim and any intervening claims. At this time, however, applicant does not amend the claims 16, 40, 64, and 88.

It is respectfully submitted that in view of the amendments and arguments set forth herein, the applicable rejections and objections have been overcome. If there are any additional charges, please charge Deposit Account No. 02-2666.

Respectfully submitted,

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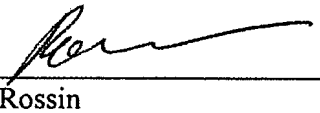

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